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1 (currently amended). A method of inductive learning comprising providing a computer that is programmed:

to provide or receive training data , including at least one of archived data, simulated nominal data and off-nominal data;

to provide vectors having a set of parameters determined from the training data; and

to generate a cluster database comprising clusters that are associated with respective ranges of values for at least a subset of the set of parameters;

to index the clusters of the cluster database based on an indexing distance of each of the clusters from a predetermined indexing reference point;

to organize the clusters into a data structure of clusters based on the cluster indexing; and

to display a relationship between at least one of the vectors and the data structure in a visually perceptible format.

2-7 (canceled).

8 (currently amended). The method of claim 1 wherein said process of generating comprises:

determining a deviation separation distance between a selected test vector and one of said clusters, and

producing a new cluster including the test vector, when the separation distance exceeds a threshold value.

9 (currently amended). The method of claim 1 wherein said process of generating comprises:

determining a ~~deviation~~ separation distance between a selected test vector and at least one of said clusters, and

expanding the at least one cluster to include the test vector when the separation distance is less than or equal to a threshold value.

10 (canceled).

11 (currently amended). A method of monitoring a system comprising providing a computer that is programmed:

to provide or receive a cluster database comprising clusters that are associated with respective ranges of values for at least a subset of a set of cluster parameters;

to receive at least one monitored-system vector having monitored-system parameters , with parameter values generated by sensors that provide data measured on a monitored system ; ~~and~~

to determine whether the at least one monitored-system vector is contained in ~~one~~ any of the clusters based on at least a subset of the monitored-system parameters and the subset of the cluster parameters [[.]] ; and

when at least one of the monitored-system vectors is not contained in any cluster, to determine a deviation distance of the at least one monitored-system vector from a nearest cluster, to associate the determined deviation distance with a severity of a deviation of the at least one monitored-system vector from the nearest cluster, and to display in a visually perceptible format at least one deviation distance for the parameter values for the at least one monitored-system vector from the corresponding parameter values for the nearest cluster.

12-14 (canceled).

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15 (currently amended). The method of claim 11, wherein said computer is further programmed:

to provide an additional database of clusters, associated with respective ranges of values for at least a subset of said set of parameters, the additional cluster database being annotated with diagnostic information; and

when at least one of said monitored-system vectors is not included in any ~~of~~ ~~said~~ cluster[[s]], to compare at least one of said monitored-system vectors with at least one of the clusters of the additional cluster database.

16-30 (canceled).

31 (currently amended). An apparatus for inductive learning comprising a computer that is programmed:

to provide or receive training data , including at least one of archived data, simulated nominal data and off-nominal data;

to provide at least one vector[[s]] having a set of parameters based on said training data; and

to generate a cluster database comprising clusters associated with selected ranges of values for at least a subset of the set of parameters [[.]]:

to index the clusters of the cluster database based on an indexing distance of each of the clusters from a predetermined indexing reference point;

to organize the clusters into a data structure of clusters based on the cluster indexing; and

to display a relationship between at least one of the vectors and the data structure in a visually perceptible format.

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32-37 (canceled).

38 (currently amended). The apparatus of claim 31, wherein said process of generating comprises:

determining a ~~deviation~~ separation distance between a test vector and one of said clusters, and

producing a new cluster if the ~~deviation~~ separation distance exceeds a threshold value.

39 (currently amended). The apparatus of claim 31 wherein said process of generating comprises:

determining a ~~deviation~~ separation distance between a test vector and at least one of said clusters, and

expanding the at least one of said clusters to include the test vector when the ~~deviation~~ separation distance is less than or equal to a threshold value.

40 (canceled).

41 (currently amended). An apparatus for monitoring a system, comprising a computer, having a memory storing a cluster database comprising clusters, associated with respective ranges of values for at least a subset of a set of cluster parameters, where the computer is programmed:

to provide or receive one or more monitored-system vectors having monitored-system parameter , with parameter values generated by sensors that provide data measured on a monitored system; ~~and~~

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to determine whether the monitored-system vector is contained in ~~one~~ any of

the clusters based on at least a subset of the monitored-system parameters and the

at least a subset of cluster parameters [[.]] ; and

when at least one of the monitored-system vectors is not contained in any

cluster, to determine a deviation distance of the at least one monitored-system

vector from a nearest cluster, to associate the determined deviation distance with a

severity of a deviation of the at least one monitored-system vector from the nearest

cluster, and to display in a visually perceptible format at least one deviation

distance for a parameter value for the at least one monitored-system vector from a

corresponding parameter value for the nearest cluster.

42-44 (canceled).

45 (currently amended). The apparatus of claim 41, wherein said computer is

further programmed:

to ~~store~~ provide an additional database of clusters that are associated with

respective ranges of values for at least a subset of said parameters, the additional

cluster database being annotated with diagnostic information; and

when at least one of said monitored-system vectors is not included in any of

said clusters, to compare said at least one of said monitored-system vectors with

the clusters of the additional cluster database.

46 (currently amended). The method of claim 8, wherein said computer is

further programmed to determine ~~said~~ a deviation distance by dividing said

separation distance between said test vector and said one of said clusters by a value

representing a range of values of at least one variable in said one of said clusters ._

and to associate the deviation distance with a severity of a deviation of the at least one monitored-system vector from a nearest cluster.

47 (currently amended). The method of claim 9, wherein said computer is further programmed to determine ~~said~~ a deviation distance by dividing said separation distance between said test vector and said one or said clusters by a value representing a range of values of at least one variable in said at least one of said clusters , and to associate the deviation distance with a severity of a deviation of the at least one monitored-system vector from a nearest cluster.

48 (currently amended). The apparatus of claim 38, wherein said computer is further programmed to determine ~~said~~ a deviation distance by dividing said separation distance between said test vector and said one or said clusters by a value representing a range of values of at least one variable in said one of said clusters , and to associate the deviation distance with a severity of a deviation of the at least one monitored-system vector from a nearest cluster.

49 (currently amended). The apparatus of claim 39, wherein said computer is further programmed to determine ~~said~~ a deviation distance by dividing said separation distance between said test vector and said one or said clusters by a value representing a range of values of at least one variable in the at least one of said clusters , and to associate the deviation distance with a severity of a deviation of the at least one monitored-system vector from a nearest cluster.